specimens, 5–11–33; one specimen, April 1934. *Lecythorhynchus marginatus* Cole, 12 specimens, including egg-bearing males, from *Abietinaria*, 5–11–33; 12 specimens, including egg-bearing males, from *Abietinaria*, April 1934. *Tanystylum intermedium* Cole, 14 specimens, including egg-bearing males, from *Abietinaria*, April 1934. *Pycnogonum stearnsi* Ives, three males from *Abietinaria*, April 1934.

Jenner, Sonoma County, Calif. (*near Bodega Bay*).—*Ammothea gracilipes* Cole, one female, and *Pycnogonum stearnsi* Ives, one female, both from *Campanularia*, collected by A. R. Grant, February 1934.

It will be noted in the Moss Beach collections that in 1932 *Phoxichilidium femoratum* was common and *Lecythorhynchus marginatus* was scarce, but that the situation was reversed in 1934. Unfortunately it was not possible to make regular collections to determine if this is a case of periodicity or simple coincidence. At Muir Beach, *Lecythorhynchus marginatus* and *Tanystylum intermedium* were collected from the same fronds of *Abietinaria* in equal numbers. These two species and *Pycnogonum stearnsi* occur in the *Abietinaria* along the sheltered rock wall at the north border of the beach, while *Ammothea gracilipes* occurs in hydroids and bryozoan colonies among the maze of large boulders that marks the south border of the Muir Beach cove. There is some variation in the length of the protuberance on the dorsal part of the second coxal joint in this species, in some specimens being as long or longer than the coxal segment. There was no variation observed in the direction of increased body size and reduction of these protuberances as described by Lozina-Lozinsky (1933) in his variety *borealis* of *Ammothea gracilipes* from the Gulf of Kastri.

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ZOOLOGY.—*A new trematode from* Siren lacertina: Diplostomulum sirenis, *n. sp.*[1]

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A number of *Siren lacertina* (Linnaeus), collected from marshes along the banks of the Cumberland River, near Nashville, Tenn., in October 1938, were kept in an aquarium until May 1939, when the animals were sacrificed for routine histological examination. Of four specimens examined (all that were available), three (length approximately 25 cm) were found to be infected with a trematode, herein described as a new species of the genus *Diplostomulum*. Over 100 specimens were obtained from one host, 50 from a second, 6 days

[1] Received October 27, 1939.

later, and 30 from a third, 13 days after the first animal was sacrificed. The fourth animal (14 cm) did not appear to be infected. The Diplostomula were not encysted but were free in the pericardial cavity, where they were clumped in a white mass about the ventricle. Inspection of the alimentary tract and of the great vessels revealed no similar forms in these organs.

Materials and methods.—The parasites were collected with a pen point previously dipped in black India ink on which background the white specimens were easily visible, and with which instrument they were more easily separated from the slimy exudate than would have been possible with a pipette. They were transferred to a watch glass containing physiological saline at room temperature. Specimens to be permanently mounted were fixed with acetic-sublimate, or formalin-alcohol-acetic acid. For staining, Harris's hematoxylin, borax-carmine, and hematoxylin and eosin were employed in various dilutions, and for periods of 10 minutes to 48 hours. When necessary, acid alcohol was used for destaining. Undiluted Harris's hematoxylin applied 10 minutes gave the most satisfactory differentiation.

Diplostomulum sirenis, n. sp.

Description.—General form and anatomy typical. Forebody and hindbody distinct. Forebody in living specimens thin, foliaceous, elongated, slightly concave ventrally, which concavity is retained in many preserved, unmounted specimens. Hindbody short, located posterodorsally on forebody. Oral sucker terminal, mouth ventroterminal. Acetabulum situated anteriorly in posterior half of body, circular in outline in living specimens, transversely elongated in stained mounts as result of longitudinal contraction of entire body.

Hold-fast organ prominent in stained specimens. Lateral suckers short, broad prominences in living and preserved specimens.

Pharynx long, prepharynx short, esophagus longer than prepharynx. Caeca slim, containing, in living, active forms, a dark, granular substance, which is moved slowly backward and forward in the caeca as if by peristaltic waves, and from the presence of which the dilation of the posterior termination of the caeca may be observed.

Fundament of reproductive system a darkly staining, single or irregularly lobulated mass, situated in midline at posteriormost extremity of forebody in preserved specimens.

Urinary bladder occupies greater part of hindbody, with pair of saclike anterior diverticula terminating as separate lobes at a body level immediately posterior to hold-fast organ. In stained sections these appear as isolated vesicles occupying a position between the hold-fast organ and the reproductive fundament. Two or three diverticula also extend laterad from the urinary bladder. Bladders discharge through a short, common duct and dorsoterminal pore, which contracts and relaxes rhythmically. Anteriorly, the urinary bladder proper communicates on either side with the lateral tubular portion of the reserve bladder. The remaining reserve bladder system is essentially the same as described by Hughes (1929). Numerous short

branches of the common collecting trunks, and of their tributaries, end as blind, ellipsoidal vesicles containing, in living and in certain preserved specimens, an ellipsoidal, highly refractile, calcareous concretion. Flame cells appear in pairs.

Living specimens average 0.825 mm extended, without pressure. Measurements on 16 specimens mounted in toto are given in Table 1. The 16 specimens were chosen at random from those subjected to one of each of the different fixatives and stains employed.

Table 1.—Measurements (in Millimeters) of 16 Mounted Specimens of *Diplostomulum sirenis*

Measurement	Minimum	Maximum	Average
Body:			
Length	0.370	0.577	0.482
Width	0.192	0.281	0.243
Oral sucker:			
Length	0.044	0.061	0.051
Width	0.037	0.047	0.042
Pharynx:			
Length	0.024	0.051	0.041
Width	0.013	0.029	0.021
Acetabulum:			
Length	0.034	0.062	0.048
Width	0.047	0.078	0.065
Hold-fast organ:			
Length	0.068	0.119	0.092
Width	0.047	0.081	0.070

Behavior.—In physiological saline, the animals move by attaching the oral sucker to the substrate and contracting the body. The ventral sucker next becomes attached, the oral sucker relaxes, and the anterior portion of the body stretches forward. Progress is slow. When suspended in the liquid, the movements differ in that the posterior portions of the body are alternately flexed on the sides of the body, and extended, without progress forward in space. Light from beneath results in writhing movements.

Host.—*Siren lacertina* (Linnaeus).

Habitat.—Pericardial cavity, in masses attached near ventricle.

Locality.—Marshes of Cumberland River, near Nashville, Tenn.

Type specimen.—U. S. N. M. Helm. Coll. no. 9284, mounted in toto.

Discussion.—The method and duration of fixation and staining have far-reaching effects on the size and appearance of the mounted specimen, especially in the relative size of individual structures. Lateral suckers may, in the same species, be either inverted as cuplike depressions, or extended as protuberances. The acetabulum becomes elongated transversely. The hindbody especially becomes contracted, and the urinary bladder occupies an abnormal position in stained specimens. Therefore, great care should be exercised in the setting up of new species on the basis of minor measurement differentials, the condition of the lateral suckers, or of other superficial characters, in stained mounts. Partially to offset these variations, the measure-

ments in Table 1 were made on specimens subjected to one of each of the several different techniques employed in this study.

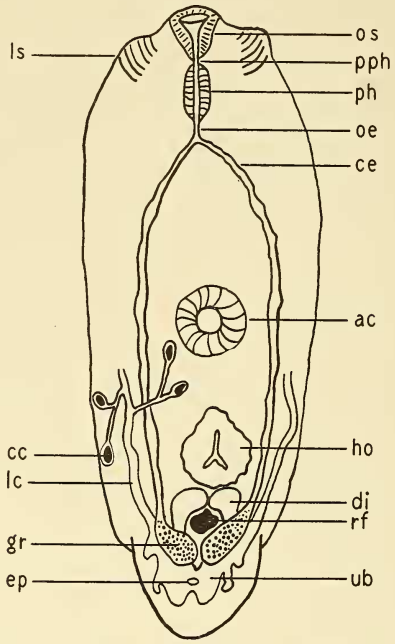

Fig. 1.—*Diplostomulum sirenis*, n.sp.

ac	Acetabulum.	*ls*	Lateral sucker.
cc	Calcareous corpuscle.	*oe*	Esophagus.
ce	Caecum.	*os*	Oral sucker.
di	Bladder diverticulum.	*ph*	Pharynx.
ep	Excretory pore.	*pph*	Prepharynx.
gr	Granular material in caecum.	*rf*	Reproductive fundament.
ho	Hold-fast organ.	*ub*	Urinary bladder.
lc	Lateral collecting vessel.		

D. sirenis resembles five other forms found in North America [*D. browni* Hughes (1929), *D. gigas* Hughes and Berkhout (1929), *D. huronense* (La Rue), described by Hughes and Hall (1929), *D. trituri* Kelley (1934), and *D. ambystomae*, described by Rankin and Hughes (1937)]. *D. sirenis* differs from *D. browni* and *D. huronense* in being larger; from *D. ambystomae* in being consistently smaller in the stained condition, and longer in living specimens, body extended, without pressure. It most nearly approaches *D. gigas* in relative size of structures, stained. *D. sirenis* differs from all these species in the presence of paired, anterior diverticula of the urinary bladder, which lie just posterior to the hold-fast organ. In this respect it resembles *D. trituri* but differs from the latter in relative measurements, which, as pointed out above, should not constitute the sole basis for introducing a new species. The most notable difference in these two forms is the presence of an additional series of conspicuous outpocketings of the reserve bladder in *D. trituri*, re-

sulting in a condition of complexity of this apparatus. Two or three similar outpocketings only are found in *D. sirenis*, and these are confined to the urinary bladder proper. *D. sirenis* is, therefore, intermediate in complexity of the reserve bladder system between *D. gigas*, which is without outpocketings, and *D. trituri*, which has many.

Finally, it is probable that the occurrence of *D. sirenis* in the pericardial cavity of *Siren* is a physiological character of specific importance, since *Triturus viridescens* spends four years strictly on land (Reinke and Chadwick, 1939), while *Siren lacertina* evidently remains, except for short excursions in underground burrows, in water where its food supply exists, and in which medium it may best respire.

Whether the hosts were infected before being placed in captivity is problematical. Three large Sirens, examined several months previously, did not appear to be infected. Opportunities were offered for infection at intervals during the latter two months of captivity, when snails and insect larvae were transferred to the aquarium from marshes where *Siren* are known to exist. Since the latter have not been observed to eat snails, infection may have arisen from one of at least two possible sources: (1) From the insect larvae, by ingestion; (2) from the snails, by swimming of the cercaria in the water, and entrance into the host via the skin (which is very thick), or via the gills or pharynx. Until *D. sirenis* may be isolated from the blood stream it seems logical to assume that the metacercaria found in the pericardial cavity probably are transmitted to the succeeding host when *Siren* is eaten by another vertebrate. Since the latter is often prey to snakes, the final host may therefore be a reptile, although the possibility of *Siren* being devoured by a bird may also exist.

A study of the life history of each of these closely related forms is indicated, to ascertain their exact taxonomic relationships.

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